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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/690,971	10/21/2003	Chih-Ying Hsu	U 014862-0	4700

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EXAMINER

GROSS, CHRISTOPHER M

ART UNIT PAPER NUMBER

1639

DATE MAILED: 03/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/690,971

Applicant(s)

HSU ET AL.

Examiner

Christopher M. Gross

Art Unit

1639

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on 14 February 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) 17-32 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 10/4/2005
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

Claims 1-32 are pending. Claims 7-32 are withdrawn. Claims 1-16 are examined herein.

#### ***Priority***

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d) to Taiwan patent 091125053, filed 10/25/2002. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

#### ***Election/Restrictions***

Applicant's election without traverse of group I, claims 1-16 in the reply filed on 2/14/2006 is acknowledged. A telephone call was made to Clifford Mass on 2/27/2006 and the election of species: nucleic acids from claim 2 and polymerase chain reaction from claim 3 was made with claims 1-16 reading thereon.

Claims 17-32 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 2/14/2006.

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-5, 8-10,13,15-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Martin et al (US Patent Application 2003/0082633).

The claimed invention is drawn to a micro-array system for a micro amount of biomolecules carrying on a bioreaction in a reaction solution, which comprises: a substrate comprising a plurality of micro-wells for receiving the reaction solution; a plurality of micro-beads placing in the reaction solution for the biomolecules attached on surfaces thereof; and a vibrating module for vibrating the substrate, which makes the biomolecules attached on the micro-beads react evenly. Claims 2-5, 8-10, 13, 15-16 represent variations thereof.

Martin et al, throughout the publication, and especially, paragraphs 0023, 0201 and 0302 disclose a chip or microtiter plate that can be associated with a solid support (such as a bead) to analyze nucleic acids and vibrate when irradiated with microwaves. The microtiter plate of Martin et al reads on the 'a substrate comprising a plurality of micro-wells' of claim 1. The nucleic acids analyzed of Martin et al reads on the 'biomolecules' of the preamble of claim 1 and the first elected species in claim 2. The association with a solid support reads on the 'micro-beads' of claim 1. The microwave radiation inducing a vibration of Martin et al reads on 'vibrating module' of claim 1.

Martin et al in paragraph 0208 disclose a type of polymerase chain reaction (PCR) with their system, reading on claim 3 and the second elected species.

Martin et al in paragraph 0120 disclose the use of a thermocouple, reading on the 'temperature control module for controlling the temperature of the reaction' of claim 10. Martin et al in paragraph 0130 disclose magnetite particles, reading on the

Art Unit: 1639

'magnetic beads' of claim 5. Martin et al in paragraph 0132 disclose silicon oxides, reading on the 'substrate made from silicon' of claim 4. Martin et al in paragraph 0146 disclose using a laser, reading on the 'laser source' of claim 13. Martin et al in paragraph 0220 disclose an air-tight plastic chamber, reading on the 'coverplate' of claim 15. Martin et al in paragraph 0286 and 0302 disclose painting the undersides of a microtiter plate with a barium titanate, a piezoelectric vibrator in the presence of microwaves, which reads on the 'vibrating module is set under the substrate' of claim 8 and the electrostatic vibrator of claim 9. Martin et al in paragraph 0299 disclose a signal visualized by X-ray film, reading on the 'signal sensor' of claim 16.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-5, 8-10, 13, 15-16 and 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Martin et al** (US Patent Application 2003/0082633) in view of **O'Neill et al** (US Patent 6124092).

The claimed invention is drawn to a micro-array system for a micro amount of biomolecules carrying on a bioreaction in a reaction solution, which comprises: a substrate comprising a plurality of micro-wells for receiving the reaction solution; a plurality of micro-beads placing in the reaction solution for the biomolecules attached on surfaces thereof; and a vibrating module for vibrating the substrate, which makes the biomolecules attached on the micro-beads react evenly. Claims 2-5, 8-10, 13, 15-16 and 6 and 7 represent variations thereof.

**Martin et al**, throughout the publication, and especially, paragraphs 0023, 0201 and 0302 discuss a chip or microtiter plate that can be associated with a solid support (such as a bead) to analyze nucleic acids and vibrate when irradiated with microwaves. The microtiter plate of Martin et al is taken to be the 'a substrate comprising a plurality of micro-wells' of claim 1. The nucleic acids analyzed of Martin et al is taken to be the 'biomolecules' of the preamble of claim 1 and the first elected species in claim 2. The association with a solid support is taken to be the 'micro-beads' of claim 1. The microwave radiation inducing a vibration of Martin et al is taken to be 'vibration module' of claim 1.

Martin et al in paragraph 0208 teach a type of polymerase chain reaction (PCR) with their system, reading on claim 3 and the second elected species.

Martin et al in paragraph 0120 discuss the use of a thermocouple and is taken to be the 'temperature control module for controlling the temperature of the reaction' of claim 10. Martin et al in paragraph 0130 teach magnetite particles and is taken to be the 'magnetic beads' of claim 5. Martin et al in paragraph 0132 teach silicon oxides for the support and is taken to be the 'substrate made from silicon' of claim 4. Martin et al in paragraph 0146 teach using a laser, which is taken to be the 'laser source' of claim 13. Martin et al in paragraph 0220 discuss an air-tight plastic chamber, which is taken to be the 'coverplate' of claim 15. Martin et al in paragraph 0286 and 0302 teach painting the undersides of a microtiter plate with a barium titanate, a piezoelectric vibrator in the presence of microwaves, which is taken to be the 'vibrating module is set under the substrate' of claim 8 and the electrostatic vibrator of claim 9. Martin et al in paragraph 0299 teach a signal visualized by X-ray film, which is taken to be the 'signal sensor' of claim 16.

Martin et al does not teach a coupling agent for the biomolecules, or the agent being 1-ethyl-3-(3-dimethylaminopropyl)-carbodiimide (EDC), however.

**O'Neil et al**, throughout the publication and especially column 18, lines 4-25 teach using EDC to immobilize oligonucleotides.

It would have been *prima facie* obvious for one of ordinary skill in the art, at the time the claimed invention was made to use the chip or microtiter plate associated with a solid support (such as a bead) to analyze nucleic acids and vibrate when irradiated by microwaves of Martin et al with the EDC immobilization chemistry of O'Neil.

One of ordinary skill in the art would have been motivated to make and use the immobilization chemistry of O'Neil et al with the chip or microtiter plate of Martin et al because it would accelerate biomolecular binding, making assays faster, as noted by Martin et al in Example 14.

One of ordinary skill could do so with a reasonable expectation of success since Martin et al provide many examples and microwaves are known in the art to accelerate chemical reactions.

Claims 1-5, 8-10,13,15-16 and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Martin et al** (US Patent Application 2003/0082633) in view of **Becker et al** (US Patent 6225061).

**Martin et al** relied on as above.

Martin et al does not teach a system comprising a temperature sensor, heater and cooler or the further limitation that the heater be a heating/sensor resistor, however.

**Becker et al**, throughout the document, and especially figure 1, teach a microchip holder comprising an integrated peltier element (for cooling) and thermistor (temperature sensing resistor), which are taken together as the temperature sensor, heater and cooler of claim 11 as well as the heating/sensor resistor of claim 12.

It would have been *prima facie* obvious for one of ordinary skill in the art, at the time the claimed invention was made to use the chip associated with a solid support (such as a bead) to analyze nucleic acids and vibrate when irradiated by microwaves of



Art Unit: 1639

Martin et al with the microchip holder comprising an integrated peltier element and thermistor of Becker et al.

One of ordinary skill in the art would have been motivated to make and use the microchip holder of Becker et al with the chip of Martin et al because it would be more versatile, providing any temperature, including less than ambient which is not possible with the chip system of Martin alone.

One of ordinary skill could do so with a reasonable expectation of success since peltier elements and thermistors are well known in the art.

Claims 1-5, 8-10,13,15-16 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Martin et al** (US Patent Application 2003/0082633) in view of **Montagu** (US Patent 6407858).

**Martin et al** relied on as above.

Martin et al does not teach a system comprising a lens, however.

**Montagu** throughout the publication, and especially the abstract, discusses using a microscope for making fluorescence measurements of biochips. Since a microscope inherently includes a lens, this is taken to be the lens of claim 14.

It would have been *prima facie* obvious for one of ordinary skill in the art, at the time the claimed invention was made to use the chip associated with a solid support (such as a bead) to analyze nucleic acids and vibrate when irradiated by microwaves of Martin et al with the biochip reader of Montagu.

One of ordinary skill in the art would have been motivated to make and use the biochip reader of Montagu with the chip of Martin et al because it would be inexpensive, as noted by Montagu in column 11, line 10-12.

One of ordinary skill could do so with a reasonable expectation of success since microscopes are well known in the art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher M. Gross whose telephone number is (571)272-4446. The examiner can normally be reached on M-F 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Wang can be reached on (571)272-0811. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

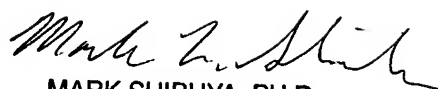
Christopher M Gross  
Examiner  
Art Unit 1639

Application/Control Number: 10/690,971

Page 10

Art Unit: 1639

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MARK SHIBUYA, PH.D.  
PATENT EXAMINER